

# Organic Farm Designing, Cropping system planning, biodiversity and conversion of conventional land to organic



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**ICAR-Indian Institute of Farming Systems Research, Modipuram**

# Issues to be considered and strategies to be adopted

Issue	Strategy
<b>High volume of organic materials is required to meet the nutrient demand for organic production</b>	<ul style="list-style-type: none"><li>• <b>Combination of sources, the nutrient demand can be met instead of single source and cropping system approach involving green manures and leguminous crops</b></li><li>• <b>Reduced application of manures after building up of organic carbon content</b></li></ul>
<b>Lack of cost effective non-chemical approach of pest and disease management</b>	<b>Cultural (cropping systems) + mechanical (traps) + leaf extract + bio-agents, the pest and diseases can be managed</b>
<b>Non availability of cost effective non-chemical weed management practices</b>	<b>Through cultural + mechanical (cono weeding etc), the weeds can be managed to some extent. However, hand/manual weeding at critical stage is essential</b>

# Organic Farming

- **Tradition** (Indigenous organic preparations, oilcakes, Green manures *etc*)
- **Innovation** (Bio-fertilizers, enriched composts *etc*)
- **Science** (Nutrient supply based on feeding the soil and plant)

# Organic Farm Design considerations

## Resource Parameters

- **Soil characteristic (organic carbon)**

SoC (%) class	<0.5 (Low)	0.50 – 0.75 (Medium)	>0.75 (High)
Approach	Start with ICM/Towards organic approach	Organic /Towards organic	Organic

- **Resource use level (Seeds, fertilizer, pesticides)**
- **Biomass generation level (only 50 % of total production is to be taken)**
- **Yield level of widely cultivated crops**
- **Category of field (irrigated/ rainfed / mixed /hills/plains)**
- **Suitability of location to maintain crop diversity**

# Organic Farm Design considerations

## Crop Parameters

- **Crops performing better under different production systems (based on literature)**
- **Speciality crops (low volume high value crops)**
- **Market demand (Export/domestic)**
- **Always start with low nutrient requiring crops**

# Basic Components

- **Diversity plantations**
- **Diversified cropping systems**
- **Crop rotations**
- **Soil fertility management**
- **Selection of varieties, seeds and planting material**
- **Nutrient management**
- **Pest management**

# Twelve parameters for choosing the option

Indicator (12 no's)	Farm Conversion process			Remarks if any
	Organic as per NPOP standards	Towards organic (Nutrient management under organic system + need based pesticides)	Towards organic (50 % nutrients through chemical sources + need based pesticides)	
Organic carbon	> 0.75 % (High)	0.50-0.75 % (Medium)	<0.50 % (Low)	-
Seeds	80-100 % (Local, improved varieties & hybrids)	<80 % (Local varieties & hybrids)	<30 % (Local varieties & hybrids)	Usage level of varieties and hybrids in crops
Fertilizers	<50 kg/ha/year (low)	50-120 kg/ha/year (medium)	>120 kg/ha/year (high)	-
Pesticides	<0.10 g a.i./ha/year (low)	0.30-0.50 g a.i/ha/year (medium)	>0.50 g a.i /ha/year (high)	Usage at different scales
Biomass production level	>20 t/ha (High)	10-20 t/ha (Medium)	<10 t/ha (Low)	Biomass includes both crop residues, green manures, animal manures etc

# Twelve parameters for choosing the option

Indicator	Production system			Remarks if any
	Organic as per NPOP standards	Towards organic (Nutrient management under organic system + need based pesticides)	Towards organic (50 % nutrients through chemical sources + need based pesticides)	
Yield level	Low	Medium	High	Compared to national/district average, class interval to be created
Category of field	Hills, rainfed	Mixed, irrigated	Irrigated, input intensive	-
Suitability for diversity	High	Medium	Low	Ratios can be made based on no. of crops grown at a given time in that particular location



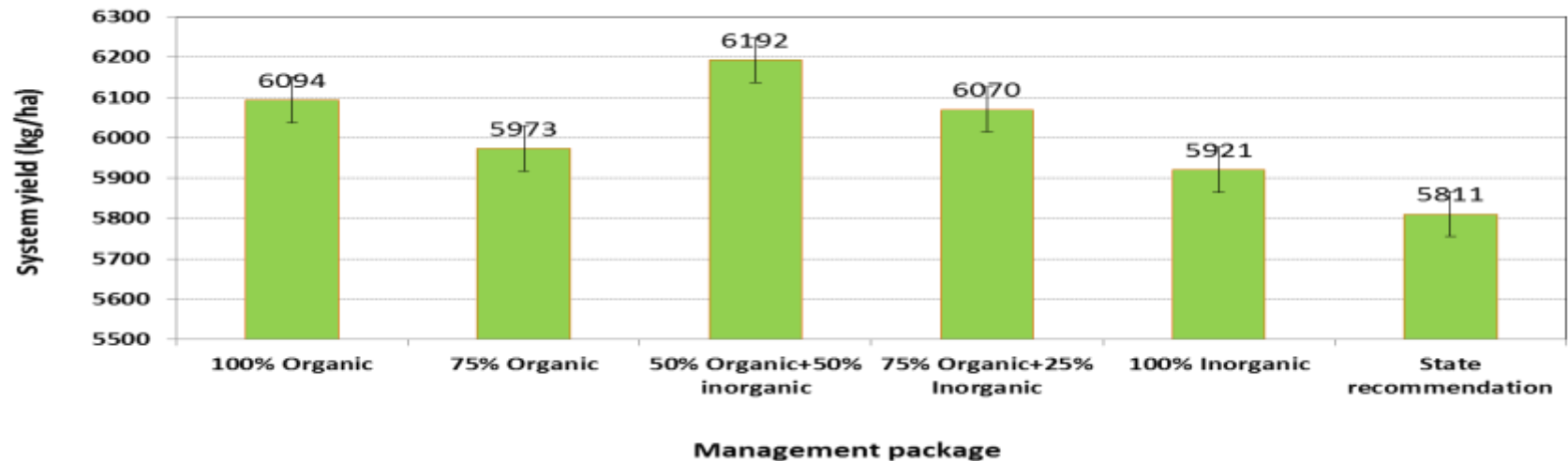
# Twelve parameters for choosing the option

Indicator	Production system			Remarks if any
	Organic as per NPOP standards	Towards organic (Nutrient management under organic system + need based pesticides)	Towards organic (50 % nutrients through chemical sources + need based pesticides)	
Market demand of crops	High	Medium	Low	Based on previous year values and forecast
Crop performance under different systems	-4 to + %	>-4-10 %	>-10 %	Based on available literature for the locality
Speciality crops suitability	High	Medium	Low	Based on farm history
Yield gap (between on-station & on-farm)	High	Medium	Low	Based on experimental evidences

# Conversion process from Conventional to Organic

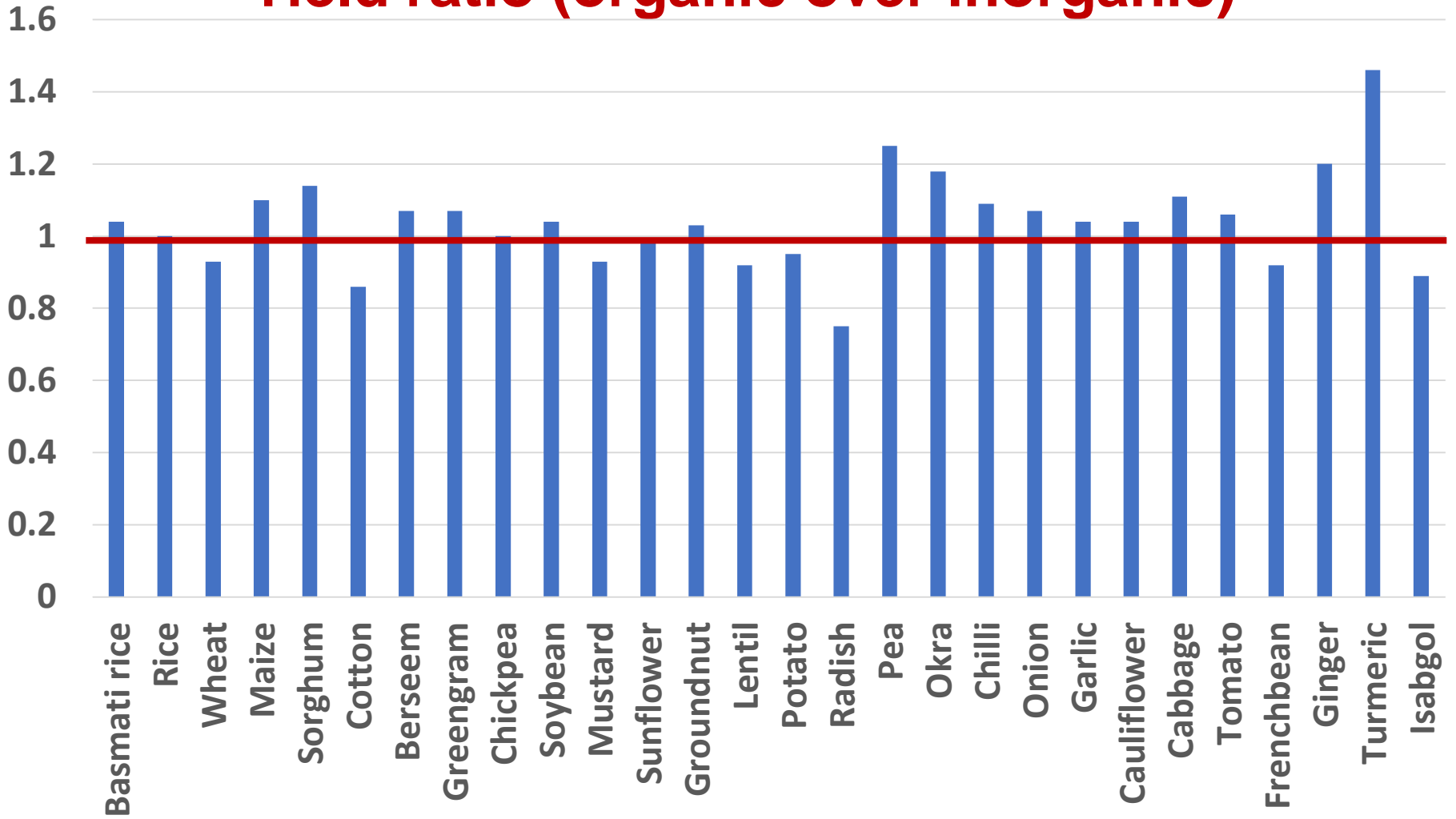
Organic management as per NPOP <i>(Organic)</i> <i>No synthetics</i>	<b>Rotational manuring</b> (Intermittent supply of 100% nutrients through organic sources and complete organic management)
	<b>Reduced manuring:</b> Supply of only 75% nutrients through organic sources complemented with indigenous practices
Integrated Crop management <i>(Towards organic)</i> <i>Staggered reduction of synthetics</i>	<b>Fixed reduction:</b> 50% organic + 50% inorganic source of nutrients and management excluding chemicals for pest and disease management
	<b>Flexible reduction:</b> 75% organic +25% inorganic source of nutrients and management excluding chemicals for pest and disease management

## Basmati rice equivalent yield of Basmati rice-wheat system (mean of 5 locations)



# Cropping System Planning

## Yield ratio (organic over inorganic)



# Varietal selection

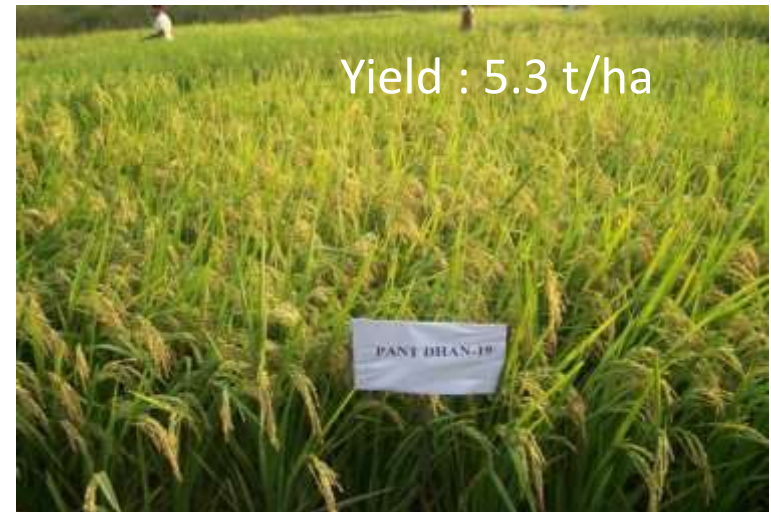
**Cereals:** coarse rice, basmati rice, durum wheat, maize

**Pulses :** chickpea

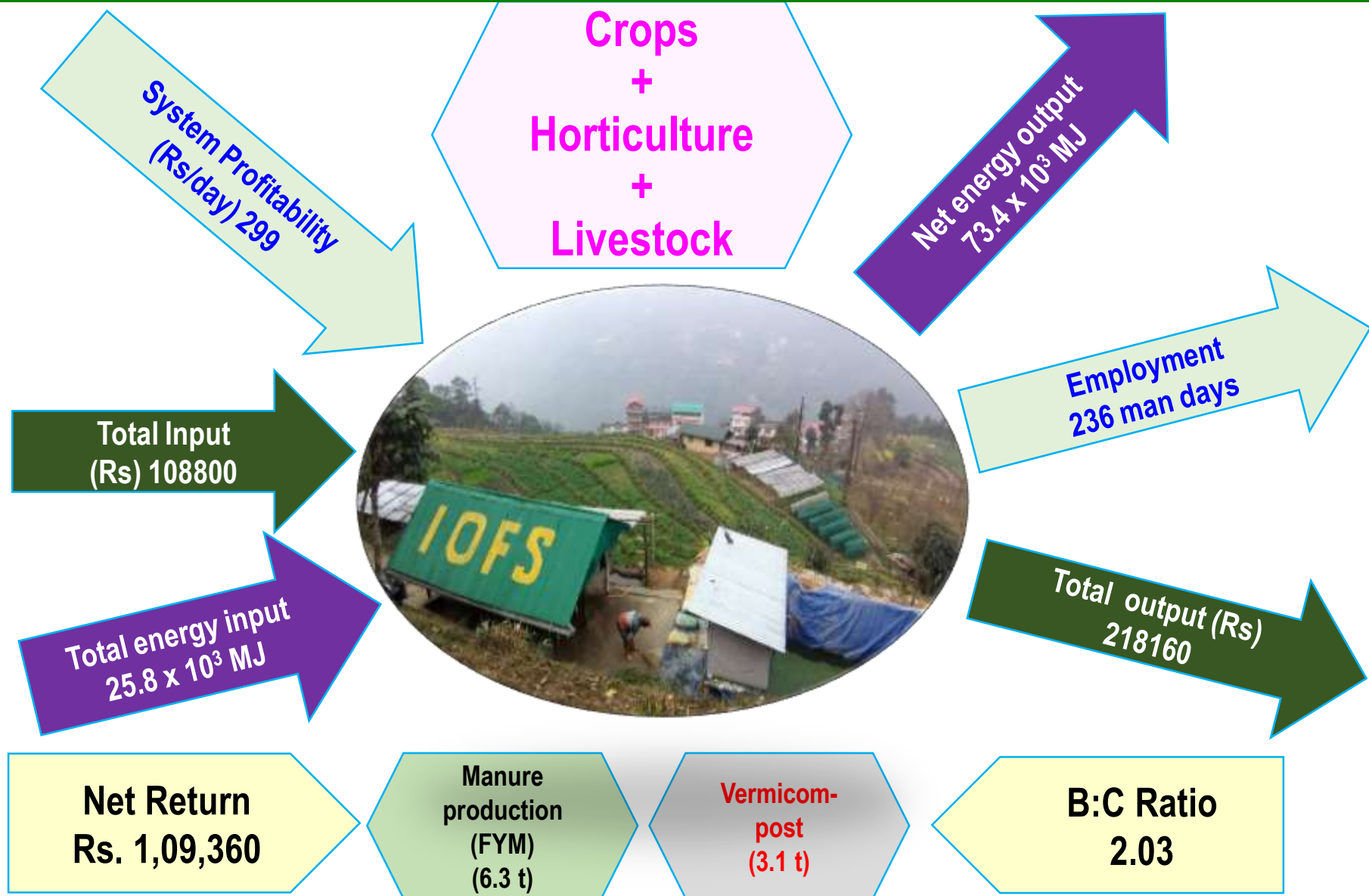
**Oilseeds:** Groundnut, mustard, soybean

**Vegetables:** Tomato, pea, okra, cauliflower, french bean)

**Spices:** turmeric



# IOFS model of 0.5 ha (Sikkim) Timpyem (44 HH) & Nandek (228 HH) in East Sikkim

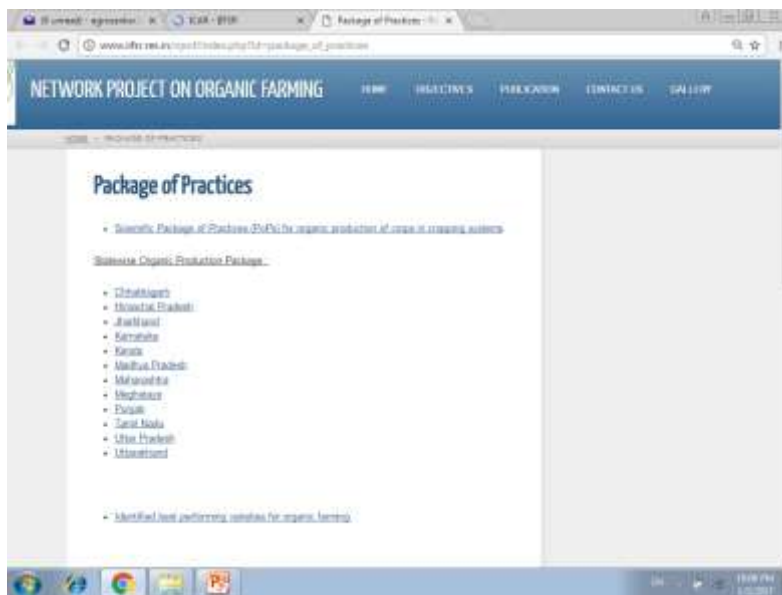


**80% of inputs requirement can be produced on-farm through IOFS**

# Scientific PoP's for organic production of crops

- Detailed Scientific PoP's for organic production of crops in [cropping systems \(62\)](#) perspective are prepared.
- 104 varieties of 21 major crops identified
- 8 IOFS models for 7 States

[www.iifsr.res.in](http://www.iifsr.res.in)



**Jaivik kheti Takneeki App**



<http://agricoop.nic.in/divisiontype/integrated-nutrient-management>



**You Tube Channel**





# Case Studies on IOFS models

Nature Day event of UN-Climate Change Conference (UK 2021; COP26)  
6 November 2021



- 9 Case studies: MOVCD-NER, IOFS in Meghalaya and Sikkim, Organic farming interventions in Chhattisgarh, Himachal Pradesh, Kerala, Tamil Nadu and Rajasthan

# Thank You

